Summary Bullet Points for Dermatomyositis:

- A dog inherits genes from each parent. In the case of the test for dermatomyositis a dog with the genotype of DLA-DRB1 002:01/002:01 Aabb means that one parent contributed 002:01 A b and the other 002:01 a b.

- 3 genes (DLA, Locus A and Locus B) act together to contribute toward the development of dermatomyositis (DMS) in Shelties and Collies.

- *DLA-DRB1* 002:01*, "A" and "B" are risk alleles (allele = version of a gene). DLA-DRB1*002:01 may be referred to as "C" especially in tables or the Genotype Calculator.

    - *015:01 and 023:01* are 2 of the known alternate (good) alleles of *DLA-DRB1.* Numbers other than 002:01 may be referred to as "c" especially in tables. *006:01* has been found in some Shelties, primarily in France.
    - Lower case letters, "a" and "b" represent normal alleles of the A and B genes.

- Concerning the DLA – For the health of an individual dog, 2 different numbers such as 002:01/023:01 (heterozygous) is better than having 2 copies of 002:01 i.e., 002:01/002:01 (homozygous).

- Concerning the DLA – An owner should NOT be upset if his/her dog has 2 copies of 002:01 (ex. 002:01/002:01). About 60% of Shelties tested in the research study were homozygous for 002:01 and 78% had at least one copy. It will take years of breeding to increase the number of dogs with alternate alleles, for example, 015:01 and 023:01. *Since 023:01 is essentially the only alternate allele to 002:01 in the USA, US breeders might consider importing dogs with alternate alleles to increase the diversity of the DLA in American Shelties.*

    - Because the 002:01/002:01 is so common in Shelties, a dog with 2 copies of an alternate allele, ex. 023:01/023:01 would be useful in a breeding program to produce pups with heterozygous (2 different numbers) DLA.

- Concerning the "A, B" genes, the goal is to reduce their frequency, but not to completely eliminate them.

    - The A's and B's are mutations of a and b, but by eliminating A and B completely, an allele of a neighboring gene might also be lost. It might be that there is an allele of a neighboring gene that is desirable and why A and B became so common.

    - When breeding, try to AVOID pairings that would produce AA and or BB in the offspring. This may not always be possible.
    - Use the Punnett squares or the DMS Calculator to predict possible genotypes that could result from a particular pairing. When possible, choose breeding pairs that would result in most or all possible genotypes of resulting puppies to be low risk. See: http://americanshetlandsheepdogassociation.org/dermatomyositis-dna-test/ .

- A dog with the aabb genotype, regardless of the DLA, can be bred to any dog to produce litters in which all pups have low risk genotypes.

- Depending on the genotypes, breeding 2 dogs with low risk genotypes can produce pups with high risk genotypes.

    - Except for the aabb genotype noted above, one must know the genotypes of a mating pair and use the Punnett squares (available on the ASSA website) to know the possible genotypes each pup could inherit.
    - There is NO dog that cannot be used in a breeding program to produce pups with low risk genotype!

- On DMS test certificates, the "Risk" interpretation refers to the risk of the dog tested to develop clinical signs of DMS, NOT necessarily the ability of that dog to produce pups with low or high risk genotypes.

- DMS test results, when posted on the OFA website, can be used as one of the electives for a CHIC number. Only the genotype, not the risk interpretation is posted on the website.

[1] Evans JM, Noorai RE, Tsai KL, Starr-Moss AN, Hill CM, Anderson KJ, et al. (2017) Beyond the MHC: A canine model of dermatomyositis shows a complex pattern of genetic risk involving novel loci. PLoS Genet 13(2): e1006604. doi:10.1371/journal.pgen.1006604. http://journals.plos.org/plosgenetics/article?id=10.1371/journal.pgen.1006604#abstract1